



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/523,216

07/14/2005

Wolfgang Clemens

411000.123

8754

27162

7590

03/03/2010

CARELLA, BYRNE, CECCHI, OLSTEIN, BRODY & AGNELLO
5 BECKER FARM ROAD
ROSELAND, NJ 07068

EXAMINER

SUCH, MATTHEW W

ART UNIT

PAPER NUMBER

2891

MAIL DATE

DELIVERY MODE

03/03/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/523,216	Applicant(s) CLEMENS ET AL.	
	Examiner MATTHEW W. SUCH	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-15 and 17-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-15 and 17-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The amendment filed 17 February 2009 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the phrase "(polypropylene)" added to Para. [00014] of the specification is new matter. The originally filed disclosure provides no support for PP being polypropylene.

Response to arguments: *The Applicant argues that PP is commonly known to be polypropylene and asserts that the polypropylene is inherent to PP and that the Office has admitted to PP being polypropylene. This is not the case. It is unknown what PP was intended to be and polypropylene is not an inherent material of PP. Furthermore, the Applicant's originally filed disclosure fails to provide any evidence of what PP is and a mere assertion that polypropylene is PP does constitute evidence. For example, PP is a common abbreviation to other materials distinct from polypropylene, such as polypyrrole (see US 4,891,733 Col. 1, Line 62; US 4,832,869, Col. 2, Line 37; US 4,629,798, Col. 4, Line 34, at least). Applicant is required to cancel the new matter in the reply to this Office Action. The Applicant is invited to point out where in the originally filed disclosure the word "polypropylene" appears in order to identify support for this amendment.*

Art Unit: 2891

2. The amendment filed 22 October 2009 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the phrases of "in the alternative, the layer 4 as shown in Figures 5-7 (or layers 4 and 5)" and "or as in Figs. 3-7, a void is created in the layers due to the presence of the non-wetting element" and "or its equivalent" added to Para. [0022] of the specification is new matter. This language adds the disruption element of Element 7 from the Embodiment of Figure 8 into the embodiments of Figures 3-7. This is not supported by the originally filed disclosure. However, while the Applicant is entitled to language which describes that Element 3 in the embodiment of Figures 3-7 is a disruption element, the language currently presented indicates that the disruption element of Element 7 in Figure 8 is being added to the embodiments of Figures 3-7.

3. The disclosure is objected to because of the following informalities: the word "polymethrethacrylate" in Line 8 of the newly amended Para. [0016] should read "polymethylmethacrylate". Appropriate correction is required.

Claim Objections

4. Claim 12 is objected to because of the following informalities: the phrase "of different material" in Line 3 should read "of different materials".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 2-3 and 14-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not disclose the combination of elements including the (i) disruption element and (ii) the truncated conical cross-section profile of the through plating. The truncated conical cross-section profile of the through plating is disclosed in the embodiment of Figures 1-7 which does not have the disruption element as a separate item (instead, the disruption element actually is the through plating). The disruption element is disclosed in the embodiment of Figure 8, which does not show the truncated conical cross-section profile of the through plating.

Claim 13 as written describes a first layer (Element 2 in Figure 8), a disruption element (Element 7 in Figure 8) on a portion of the first layer over a given region of the first layer, a plurality of layers (Element 4 in Figure 8) applied to the first layer, at least a first portion of the plurality of layers comprising predominantly organic material, the disruption element being arranged to result in a void in a second portion of the plurality of layers in the area above the disruption element when the plurality of layers are applied to the first layer including the

Art Unit: 2891

disruption element (this language renders the claim indefinite, see below), a through plating (Element 6 in Figure 8) in the resulting void for forming an electrical interconnection to at least two of the plurality of layers. However, claims 2-3 and 14-15, which depend from claim 13, then change the through plating (Element 6 in Figure 8) to the truncated conical cross-section profile of the through plating (Element 3 in Figures 2-7). The through plating of Element 6 cannot itself be the truncated conical cross-section profile of the through plating because it does not have such a shape.

Response to arguments: *The Applicant argues that such a combination of elements is supported by the originally filed disclosure. The main point of the Applicant's arguments (on Pages 16-25) are that the through plating of the embodiments of Figures 2-7 is the disruption element. In response, it is noted that the through plating of the embodiments of Figures 2-7 is a truncated conical cross-section profile through plating. It is clear from the Applicant's disclosure that the truncated conical cross-section profile through plating is the disruption element for the embodiments recited in Figures 2-7. However, this is not at issue with the present rejection. The entirety of the Applicant's argument that the through plating is the disruption element, which is supported by the specification when the truncated conical cross-section profile through plating is the through plating, is not relevant to the scope of claims 2-3 and 14-15 and is not commensurate with the scope of the rejection related to these claims.*

The rejection is based on the fact that these claims recite having BOTH a disruption element AND a truncated conical cross-section profile through plating as separate elements. This combination of elements is not supported by the Applicant's disclosure. The manner in which claims 2-3 and 14-15 are written requires BOTH (1) the disruption element and (2) the

Art Unit: 2891

truncated conical cross-section profile through plating (contrary to the Applicant's arguments, the claims do not recite language such as "the disruption element comprises a truncated conical cross-section profile through plating"). Instead, since the claims require BOTH (1) a disruption element and (2) a truncated conical cross-section profile through plating, then the embodiment which most closely supports this is that of Figure 8 and associated text. Figure 8 and the associated text disclose a disruption element (Element 7). However, the disruption element (Element 7) of the embodiment of Figure 8 is not a through plating, nor is Element 7 a truncated conical cross-section profile through plating. Instead, the through plating in this embodiment of Figure 8 is Element 6. However, while Element 6 is a through plating, it is also not a truncated conical cross-section profile through plating. Therefore, while the specification does support having (i) or (ii):

- i. both a disruption element and a through plating, OR*
- ii. a truncated conical cross-section profile through plating as the disruption element,*

the specification does not support having both a disruption element and a truncated conical cross-section profile through plating as separate elements in the same embodiment. As such, the Applicant's arguments are not persuasive and the rejection is deemed proper and maintained.

7. Claim 11 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Art Unit: 2891

The claim recites "polypropylene" in Line 3 of the claim. This material is not supported by the originally filed disclosure and is therefore new matter.

8. Claim 23 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. As currently written, claim 23 adds in a third plurality of layers that the through plating extends through. However, such language has introduced more layers into the device than are disclosed by the specification. The previous claim 17 requires a first plurality of layers, which includes a second plurality of predominantly organic functional layers and the first plurality of layers includes a first lower layer (Element 2 in Fig. 4, for example) and a central layer (Element 4 for example). The specification only discloses one more layer (Element 5, for example) that the through plating (Element 3) extends through. Since the claim uses the language of "a third plurality", this requires more than one additional layer, such as two layers. One layer is disclosed (Element 5, for example), but a second layer is not disclosed (which is needed in order for a third plurality of layers to be present). The examiner notes that the Applicant has not provided any additional argument or explanation of how claim 23 is supported by the originally filed disclosure in the Remarks filed on 22 October 2009 nor addressed the issues raised by the rejection. As such the examiner's remarks from the Office action dated 23 June 2009 still apply and the rejection of claim 23 under 35 U.S.C. 112, first paragraph, as set forth is proper and maintained.

9. Claims 25 and 26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not disclose the combination of elements including the (i) disruption element and (ii) the truncated conical cross-section profile of the through plating. The truncated conical cross-section profile of the through plating is disclosed in the embodiment of Figures 1-7 which does not have the disruption element as a separate item (instead, the disruption element actually is the through plating). The disruption element is disclosed in the embodiment of Figure 8, which does not show the truncated conical cross-section profile of the through plating. Claims 17 and 20 as written sets forth the truncated conical through plating (equivalent to Element 3 in Figs. 1-7). It is noted that the truncated conical through plating is also a disruption element. However, claims 25 and 26, which depend from claims 17 and 20, further add a disruption element as an element that is separate and distinct from the truncated conical through plating. This combination of elements is unsupported by the originally filed disclosure and constitutes new matter. Furthermore, claim 26 adds a disruption element on and contiguous to the first layer comprising the truncated conical through plating. The specification does not set forth subject matter that forms a disruption element on first layer having the truncated conical through plating which causes a void in the at least two central layers being applied subsequently.

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

Art Unit: 2891

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This claim is indefinite for a variety of reasons. The claim recites "forming a plurality of layers of different material including a first lower layer, a majority of which layers are of predominantly organic material and which plurality of layers". However, is the recitation of "a majority of which layers" and "which plurality of layers" referring to (i) all of the plurality of layers including a first lower layer, or (ii) the plurality of layers with the exception of the first lower layer? Which layers are the "which layers" in terms of antecedent basis? The claim recites "the forming of the first lower layer being followed by forming subsequent layers deposited sequentially on the first lower layer". However, this recitation renders the claim indefinite because it is unclear how the "subsequent layers" relate to "a plurality of layers" or if the "subsequent layers" are new elements that are not included as part of the plurality of layers. The claim recites the limitation "the other" in Line 6. There is insufficient antecedent basis for this limitation in the claim. The phrase contiguously onto a with the first lower layer" renders the claim indefinite because it is unclear how the subsequent layers can be sequentially deposited on the first lower layer and with the first lower layer at the same time.

Response to arguments: *The Applicant asserts that claim 12 is definite, particularly in regards to the plurality of layers and subsequent layers. The Applicant asks for clarification on this matter. The issue is as follows. This claim is written is sets forth a plurality of layers including a first lower layer followed by a recitation of "which layers" Is this recitation*

Art Unit: 2891

referring back to (i) all of the plurality of layers including a first lower layer, or (ii) the plurality of layers with the exception of the first lower layer? Which layers are the "which layers" in terms of antecedent basis? The claim then recites forming subsequent layers, which renders the claim indefinite because it is unclear if subsequent layers is intended to refer back to the previously mentioned plurality of layers or if these are new layers that are independent and distinct therefrom. In other words, is the Applicant attempting to claim subsequent layers in addition to the plurality of layers or is the Applicant introducing a nomenclature change of the plurality of layers by renaming them as subsequent layers. The Applicants arguments and amendments fail to address or even acknowledge this issue.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. In so far as definite, claims 4, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friend (WO '987; provide in Office Action dated 23 June 2009) in view of Sakai (JP '046; provide in Office Action dated 23 June 2009) in view of Gudesen ('739).

a. Regarding claims 12 and 13, Friend teaches a process of producing at least one through-plating by forming a plurality of layers (Elements 1, 2, 3, 4, 5, 7 in Fig. 14c or

Art Unit: 2891

Elements 1, 2, 3, 4, 5, 6, 7 in Fig. 14d) including a first lower layer (Element 3). These layers comprise different materials (Elements 4 and 5 are of different organic materials, including an insulating layer (Element 5) and a semiconductor layer (Element 4). A majority of the layers are organic material and which organic material includes insulating layers (Page 10, Lines 17-20 teaches that Elements 2 and 3 are organic; Page 11, Lines 11-18 teaches that Element 4 is organic; Page 12, Lines 20-28 teaches that Element 5 is organic; Page 15, Lines 3-10 teaches that Element 7 is organic). The forming of the first lower layer is followed by forming subsequent layers (Elements 4, 5, 7 in Fig. 14c or Elements 4, 5, 6, 7 in Fig. 14d) on the first lower layer. Continuing, after the void is formed, a through plating (Element 6 in Fig. 14c or Element 32 in Fig. 14d) is formed in the resulting void wherein at least a second portion of layers of the subsequently deposited layers are ohmically intercoupled to the through plating (Elements 4 is coupled to Element 6 ohmically, see schematic of Figure 15b). Friend teaches forming a void by forming a first lower layer including forming a disruption element of solvent material (Pages 33-34) on the first lower layer which etches through the layers. The etching is arranged to result in a void in at least a first portion of subsequently deposited layers on the first lower layer instead of a disruption element in directly on the first lower layer which results in a void of the spin coated layers formed thereon.

However, Sakai teaches a method of forming a first lower layer (Element 2) with a disruption element (Element 6) formed in contact with the first lower layer and on the first lower layer. Subsequently deposited organic layers are then coated thereon and a void is formed where the disruption element is located (see Fig. 2c). Following the

Art Unit: 2891

coating of the subsequent layers and the void formation, a through plating (Element 4) is formed on the void (see Fig. 2d). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the void of Friend by forming a disruption element on and in contact with the first lower layer prior to the forming of the subsequent layers as taught by Sakai. One would have been motivated to do so since Sakai teaches that this method has the advantage of formation of a via hole without using an etching process of interlayer insulating layers, thereby avoid the problems associated with etching through the layers, including no communication between a through plating and an underlying electrode (first layer), enabling a large area electronic device with high yield rates (see Sakai Para. 0008-0009).

Continuing, since Friend only teaches a single device with that at least a second portion of layers of the subsequently deposited layers are ohmically intercoupled to the through plating (Element 4 is coupled to Element 6 ohmically, see schematic of Figure 15b), there is no disclosure of the through plating ohmically intercoupling at least two layers of subsequently deposited layers.

However, Gudesen teaches a organic semiconductor device that has a plurality stacked on one other with a conductive through plating (Elements d, 9, 15 in hatches and black in Fig. 12) ohmically intercoupling a plurality of organic semiconductor layers (Elements b, 10 in dotted Fig. 12) layered together with a plurality of organic insulator layers (Elements SS in white in Fig. 12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a very large plurality of organic semiconductor layers and organic insulating layers with the plurality or organic

Art Unit: 2891

semiconductor layers ohmically intercoupled to each other by the through plating, as taught by Gudesen, in the methods and device of Friend. One would have been motivated to do so since Gudesen teaches that this multiple stacked configuration reduces the real-estate area required for forming organic electronic circuits (see Col. 4, Lines 8-28 and Col. 16, Line 67 and Col. 17, Lines 1-8).

Response to arguments: *The Applicant argues that it is improper to combine Friend and Sakai since, as the Applicant argues, Friend teaches an etching to form a via while Sakai teaches a disruption element and hence is a teaching away. This is not persuasive. Sakai does not teach away. On the contrary, the methods of Sakai are taught by Sakai to solve problems of via formation by etching (see Sakai Para. 0008-0009). Therefore, this is not a teaching away, but rather the combination of Friend in view of Sakai comprises an improvement to the process of Friend as taught by Sakai and shown in the Office action.*

b. Regarding claim 4, Friend teaches that the component includes an electrically non-conducting insulating material wherein the non-conducting material is polyhydroxystyrene (see Page 12, Line 21), polymethylmethacrylate (see Page 13, Line 1), or polystyrene (see Page 15, Line 10).

c. Regarding claim 5, Friend teaches that the through plating comprises a raised portion (Element 6 in Fig. 14c or Element 32 in Fig. 14d) above relative to the first layer. This layer has some level of surface roughness, which "promotes" ohmic contacting

Art Unit: 2891

because all materials have some level of surface roughness, even at the atomic or molecular scale, and the claim does not establish any degree to which the surface is rough, nor does the claim identify what level of surface roughness "promotes" ohmic contacting, or even what a promoted level of contacting is. The claim also does not establish what is being ohmically contacted. As such, given the breadth of such descriptions of the claim, the material of Friend meets the limitations of the claim as currently written.

d. Regarding claims 6 and 7, Friend teaches that the first layer comprises a lower functional layer (this claim language amounts to a mere nomenclature change since there are no elements added to what is already present) and the disruption element as modified with Sakai manifests a physical and chemical treatment of the lower functional layer since the language of manifests merely describes what the disruption element does and not what the disruption element is to further distinguish the claimed subject matter.

e. Regarding claim 8, Friend teaches that the first layer (Element 3) comprises a lower functional organic layer of PEDOT, for example (Page 10, Lines 17-20).

f. Regarding claim 9, Friend teaches that the first layer (Element 3) comprises a lower functional organic layer of PEDOT, for example (Page 10, Lines 17-20) and the disruption element manifests a locally restricted change in the surface energy of the organic functional layer. The language of "at which substantially no wetting by a

Art Unit: 2891

subsequently applied organic material of a subsequent functional layer is present", does not distinguish the claim from the structural limitations of the prior art. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997). See MPEP § 2112.01. This language does not introduce any additional elements into the claimed structure of the device, but instead merely describes the behavior of the disruption element under such conditions. Furthermore, Sakai teaches this same behavior of the disruption element (see Fig. 2c, for example).

g. Regarding claim 10, Friend in view of Sakai in view of Gudensen teaches that the disruption element is on the first layer and comprises a chemical or other arrangement which provide a material residue or physical element having a given shape on the first layer such that the disruption element is detectable by the material residue or the shape (see Element 6 of Sakai).

14. Claims 2-3 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friend (WO '987; provide in Office Action dated 23 June 2009) in view of Sakai (JP '046; provide in Office Action dated 23 June 2009) in view of Gudesen ('739) as applied to claim 13 above, and further in view of Schmidt ('881).

Friend teaches that the through plating comprises a solid conductive material of PEDOT, for example (Page 13, Line 8) and is a free-standing portion relative to the first layer (see Fig.

Art Unit: 2891

14c, for example). Friend does not teach that the through plating has a truncated conical cross section.

However, Schmidt teaches truncated conical cross-sectional through platings (Elements 11, 11'; Figure 2g, for example). It would have been obvious to one of ordinary skill in the art at the time the invention was made to truncate the conical cross-section of Friend in view of Sakai in view of Gudesen as taught by Schmidt in order to increase the surface area of the contact interface, thereby reducing contact resistance to the gate electrode portion of the device (see Schmidt Col. 4, Lines 28-31).

15. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Friend (WO '987; provide in Office Action dated 23 June 2009) in view of Sakai (JP '046; provide in Office Action dated 23 June 2009) in view of Gudesen ('739) as applied to claim 13 above, and further in view of Kelley ('472).

Friend in view of Sakai teaches glass substrate instead of a plastic substrate which includes one of PET, PP, PEN, polyimide, polyamide, and coated paper.

Kelley teaches plastic substrates including, for example, polyimide (see Para. 0017). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a polyimide substrate as taught by Kelley in the device of Friend in view of Sakai in view of Gudesen. One would have been motivated to do so since Kelley teaches that polyimide plastic substrates are advantages because they are flexible and allow for roll-to-roll processing providing for economies of scale over rigid substrates (see Para. 0017).

Art Unit: 2891

16. Claims 17-24 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ezawa ('839) in view of Gudesen ('739) in view of Schmidt ('881).

h. Regarding claims 17 and 20, Ezawa teaches an electronic component comprising a first plurality of layers (Elements 1, 2, 3, 4, 5) including a second plurality of predominantly organic functional layers (Elements 3 and 5, for example). The first plurality of layers are of different materials. At least one of the first plurality of layers comprises a first lower layer (Element 2) and one of the other layers forms a central layer (Element 3). At least one through plating (Element 11) having a conical cross-sectional profile extends from a wider cross-sectional profile region at and contiguous with and overlying the first lower layer through the central layer transversely to the central layer to a narrower upper cross-sectional region spaced apart from the first lower layer (see Fig. 5, for example). The at least one through plating extends at least in part below the central layer (base of Element 3 extends below Element 3) and is electrically coupled to at least two layers of the first plurality of layers (such as Elements 2 and 4).

Ezawa does not teach a plurality of central layers, including central layers that are ohmically coupled to the through plating. However, Gudesen teaches an organic semiconductor device that has a plurality stacked on one other with a conductive through plating (Elements d, 9, 15 in hatches and black in Fig. 12) ohmically intercoupling a plurality of organic semiconductor layers (Elements b, 10 in dotted Fig. 12) layered together with a plurality of organic insulator layers (Elements SS in white in Fig. 12). It would have been obvious to one of ordinary skill in the art at the time the invention was

Art Unit: 2891

made to form a very large plurality of organic semiconductor layers and organic insulating layers with the plurality of organic semiconductor layers ohmically intercoupled to each other by the through plating, as taught by Gudesen, in the device of Ezawa. One would have been motivated to do so since Gudesen teaches that this multiple stacked configuration reduces the real-estate area required for forming organic electronic circuits (see Col. 4, Lines 8-28 and Col. 16, Line 67 and Col. 17, Lines 1-8).

Ezawa does not teach that the conical cross-sectional through plating is truncated. However, Schmidt teaches truncated conical cross-sectional through platings (Elements 11, 11'; Figure 2g, for example). It would have been obvious to one of ordinary skill in the art at the time the invention was made to truncate the conical cross-section of Friend in view of Sakai in view of Gudesen as taught by Schmidt in order to increase the surface area of the contact interface, thereby reducing contact resistance between conductive layers in the electronic device (see Schmidt Col. 4, Lines 28-31).

i. Regarding claim 18, Ezawa teaches that through plating is conductive (see Col. 3, Lines 65-67, at least). Ezawa as modified by Gudesen teaches that the through plating is ohmically coupled to at least two of the second plurality of layers.

j. Regarding claims 19 and 22-23, Ezawa as modified by Gudesen teaches a third (further) plurality of layers (and a fourth and fifth, etc.) are on the first layer layers and form upper layers, the through plating extends from the first lower layer to through the upper layers and is ohmically coupled to the third (further) plurality of layers. The at

Art Unit: 2891

least one through plating extends at least in part below the central layer (base of Element 3 extends below Element 3) and is electrically coupled to at least two layers of the first plurality of layers (such as Elements 2 and 4).

k. Regarding claim 21, Ezawa as modified by Gudesen teaches that first and second plurality of layers are further lower layers and upper layers, the through plating decreasing in diameter as the through plating extends from a lower layer to the upper.

l. Regarding claim 24, Ezawa teaches that the through plating is solid, such as pillar (see Col. 3, Lines 65-67).

m. Regarding claim 27, Ezawa teaches a method of forming an electronic component comprising forming a lower layer (Element 2 in Fig. 2), forming a free standing conical cross sectional profile through plating (Element 11 in Fig. 2) extending and tapering from a lower cross section area at the lower layer to an upper most cross sectional area smaller than the lower cross sectional area (see Fig. 2). A further layer (Element 3 in Fig. 3-4) is formed overlying and contiguous with the lower layer surrounded by and contact the through plating extending therethrough, forming a central layer and is organic (see Col. 4, Line 12 teaching polyimide).

Ezawa does not teach a plurality of central layers, including central layers that are ohmically coupled to the through plating and having a first upper layer and a second upper layer that is overlying and contiguous with the first upper layer and the through

Art Unit: 2891

plating. However, Gudesen teaches a organic semiconductor device that has a plurality stacked on one other with a conductive through plating (Elements d, 9, 15 in hatches and black in Fig. 12) ohmically intercoupling a plurality of organic semiconductor layers (Elements b, 10 in dotted Fig. 12) layered together with a plurality of organic insulator layers (Elements SS in white in Fig. 12). The upper two most layers of the layers of Gudesen comprise a first upper layer and a second upper layer with the second upper layer being contiguous with the first upper layer and the through plating. It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a very large plurality of organic semiconductor layers and organic insulating layers with the plurality of organic semiconductor layers ohmically intercoupled to each other by the through plating, as taught by Gudesen, in the device of Ezawa. One would have been motivated to do so since Gudesen teaches that this multiple stacked configuration reduces the real-estate area required for forming organic electronic circuits (see Col. 4, Lines 8-28 and Col. 16, Line 67 and Col. 17, Lines 1-8).

Ezawa does not teach that the conical cross-sectional through plating is truncated. However, Schmidt teaches truncated conical cross-sectional through platings (Elements 11, 11'; Figure 2g, for example). It would have been obvious to one of ordinary skill in the art at the time the invention was made to truncate the conical cross-section of Friend in view of Sakai in view of Gudesen as taught by Schmidt in order to increase the surface area of the contact interface, thereby reducing contact resistance between conductive layers in the electronic device (see Schmidt Col. 4, Lines 28-31).

Art Unit: 2891

Response to Arguments

17. Applicant's arguments filed 22 October 2009 have been fully considered but they are not persuasive for the reasons set forth above (see Response to Arguments sections above). For responses to each specific argument set forth, see the responses to arguments above in the Office Action (they have been included above in order to most simply match each argument with each respective rejection or objection). The remainder of the Applicants arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Enclosed is an official translation of Sakai (JP `046).

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 2891

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW W. SUCH whose telephone number is (571)272-8895. The examiner can normally be reached on Monday - Friday 9AM-5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kiesha Bryant can be reached on (571) 272-1844. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew W. Such/
Examiner, Art Unit 2891